6-18-2013

Sustainable Supply Chain Management through Compliance of Stakeholders' Requirements: A Study on Ready-Made Garment (RMG) Industry of Bangladesh

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SUSTAINABLE SUPPLY CHAIN MANAGEMENT THROUGH COMPLIANCE OF STAKEHOLDERS' REQUIREMENTS: A STUDY ON READY-MADE GARMENT (RMG) INDUSTRY OF BANGLADESH

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ABSTRACT

Sustainability in supply chain is now an issue of concurrent focus, as stakeholders are demanding sustainability from the point of production to the point of consumption. Research on sustainable supply chain management (SSCM) is not substantial in number. Most of the studies concentrate on social, environmental, and economic aspects of supply chain in a standalone fashion. Further, previous studies are dominantly conceptual in nature. Comprehensive empirical research on sustainable supply chain management incorporating social, environmental and economic aspects is very rare. Upon existence of such void in the literature this study aims at developing a comprehensive SSCM framework in the context of RMG supply chain of Bangladesh. An exploratory field study utilizing an inductive methodology involving a multiple-case study approach has been undertaken. Data have been collected by conducting face to face interviews with 15 decision makers of RMG manufacturing companies and their suppliers. We utilize content analysis techniques with a view to identify the factors with their associated. It is novel in the research findings that, apart from compliance of the triple bottom line components, compliance of buyers' operational requirements and sustainability governance are also important components of RMG supply chain sustainability. Further, some important interrelationships among sustainability factors have been explored. Finally, based on the extracted sustainability components and their interrelationships an integrated SSCM model has been developed.

Keywords: Sustainability, supply chain, compliance.

1. INTRODUCTION

Climate change, depletion of resources, increased pollution, energy consumption, violation of social rights and poor working environment have brought the agenda of sustainability in every walk of our life and within the broader facets of society. Pressure on the issues of sustainability is increasing and it is very high in industries with substantial environmental impact (Seuring et al., 2008) such as global apparel industry which accounts for 9.3% of world's employees and 4% of worldwide exports (World Trade Organization, 2008). Individuals and organizations need to rethink about the existing fashion of production and consumption for ensuring a liveable world. Today, the domain of sustainability has magnified beyond the organizational boundary with incorporating the whole rubric of the supply chain (Gold et al., 2010). The shifting of focus on sustainability to whole supply chain is due to the consumers' concern about the types of working conditions from where products are manufactured and supplied (Carter and Rogers, 2008). Unlike the past, supply chains now need to consider social and environmental factors along with the economic aspects (Seuring and Muller, 2008); Carter & Rogers, 2008). In the contemporary world SSCM has got even more focus because of the high profile corporate failures (Aaronson, 2002), and failure to observe social and environmental issues by the chain members (Kolk and Pinkse, 2006); Chowdhury et al, 2012). Among the lot, an evidence of non-compliances is the indecent working environment in apparel manufacturing companies of underdeveloped countries (Islam and Deegan, 2008); (Emmelhainz and Adams, 1999)). Such non-compliance and violation of social and environmental issues is not unlikely in the corporations of many developing countries such as Bangladesh, Pakistan (Naeem and Welford, 2009). Manifestation of these sorts of non-compliances often create pressure on the chain from customers and stakeholders to comply with social and environmental sustainability issues (Hossan et al., 2012); (Islam and Deegan, 2008); Chowdhury et al. (2012). To Mahmud and Kabeer (2003) the RMG supply chain is buyer dominated. Moreover, the RMG manufacturers and their suppliers need to meet the compliance issues imposed by the buyers, in order to sustain and stay competitive in business. Besides, the prevalence of violation of social compliance such as poor wages and poor working environment often are the causes of labour unrest and instability in RMG manufacturing companies (Hossain et al., 2012) which is a threat of sustainability for the whole supply chain. In such a situation, designing a sustainable supply chain model is crucial which can be applied to RMG supply chain of Bangladesh. Few researchers (Carter and Easton, 2011); (Pagell and WU, 2009); (Seuring and Muller, 2008); (Gold et al., 2010) and others) conducted research on sustainable supply chain management (SSCM). But most of the studies in the literature regarding sustainability have got some limitation because studies are mostly concerned with environmental aspects and social sustainability issue is not explored much. Further, comprehensive empirical study on supply chain sustainability integraing social, economic and environmental aspects is very rare and it is even absent in RMG industry of Bangladesh. An inquiry into the previous researches on SSCM also reveals that companies and their chains adopt SSCM volutarily as a source of competitive advantage for the chain (de Brito et al., 2008); (Pagell and WU, 2009); Carter & Rogers, 2008) or imposed by the stakeholders (Gold et al., 2010) but how such imposition leads to implement sustainability in the chain in the long run is not conducted before throughly. Moreover, sustainability of a supply chain has not been explored beyond the rubric of triple bottom line components and the interrelationship among the sustainability components are not much widely explored through empirical study. Upon existence of such theoritical gap, the research endaevour of this paper is to develop a SSCM model in the context of RMG industry of bangladesh and therefore, investigate the following research questions:

1) What are the salient components of sustainability in RMG supply chain of Bangladesh?
2) What are the interrelationships among the components of (SSCM) model with regards to RMG supply chain of Bangladesh?

The proposed SSCM model will help the RMG manufacturers and suppliers to comply with buyers' sustainability requirements by identifying the necessary components and indicators of RMG supply chain sustainability. Eventually, it will enable the RMG supply chain members to establish stability in RMG industry by ensuring workers' rights, and gaining buyers' and other stakeholders' satisfaction.

The next section of the paper states the background literature followed by the research design, and findings. Then a comprehensive research model is depicted. The concluding part of this paper includes discussion and implications, limitations and conclusion.

2. RESEARCH BACKGROUND

Bangladesh is one of the leading exporters of RMG in the world. RMG industry is an economic propeller of Bangladesh and accounts for 76% of total export earnings and over 2.5 million direct employments of which 80% are women. Moreover, the industry has grown from 31.57 million US dollar business in 1983 to 10699.8 million US dollar during 2008 (BGMEA report 2007-2008). Because of enormous economic importance in the economy of Bangladesh long term sustainability in RMG supply chain is necessary. Besides, the RMG supply chain is facing a climax situation owing to myriads of challenges such as labour unrest for violation of human rights, poor wages, poor safety measures and hazardous working environment; environmental pollution, political instability, interruption in utility supply especially power shortage, inefficiency in customs and port management, exchange rate fluctuation, warehousing problem, disruption in supply of fabrics and other accessories in time, increased competition, inefficiency in operation, (Chowdhury et al, 2012; (Islam and Deegan, 2008), Haider, 2007; Majumder 2001). The buyers, NGOs, Government, media and other stakeholders often express their concern for the working environment in RMG industry of Bangladesh. The recent incidence of fire in Tazreen fashion near Dhaka and loss of life of 112 workers has caught the attention of international media. For example, Washington post headlined the incidence as "THE TRAGEDY: A garment-factory blaze in Bangladesh this Saturday killed at least 112 people" (www.washingtonpost.com). World's largest fashion site fibre2fashion posted that more than 120 workers killed in Tazreen fashion in recent fire blaze and two years ago, a transformer blast had killed at least 117 people at a clothing factory in Dhaka. It also mentioned that over 500 people have lost their lives in fires at various apparel units across Bangladesh in the last 5-6 years (www.fibre2fashion.com). The buyers are criticized by the media and consumer groups due to sourcing from noncompliant factories and sacrificing social and environmental quality to reduce cost. For example, Wal-Mart was criticized for sourcing from Tazreen fashion and after the incidence of fire which is a reputation loss for both of Wal-Mart and RMG industry of Bangladesh. Further, increased lead time and cost due to disruptions in procurement and shipment of goods (Nuruzzaman, 2009) lack of linkages and co-ordination among related industries in the value chain and dependence on imported inputs and limited variety finished products (Quashem 2002; Ahmed 2011), fall of order because of global economic downturn (Chowdhury et al. 2012) are issues of high concern for RMG supply chain of Bangladesh. These incidences often threaten the sustainability of RMG supply chain of Bangladesh. In such a situation it is crucial to find ways and means to make RMG supply chain sustainable. Previous researchers focused mainly on RMG competitiveness, the existing vulnerabilities of the industry (Chowdhury, Dewan and Quaddus, 2012; (Islam et al., 2012)violation of social issues ((Islam and Deegan, 2008); (Hossan et al., 2012)) sustainability barriers (Chowdhury, Dewan, Hossan and Quaddus, 2012) sustainability requirements of the buyers (Chowdhury, Dewan, and Quaddus, 2012) and status of sustainability reporting practices ((Islam and Deegan, 2008); (Naeem and Welford, 2009) in the industry but the concept of developing a SSCM model has not been studied. In this theoretical lacuna the researchers are motivated to conduct the underlying research.

3. LITERATURE REVIEW

3.1 Sustainability

As the time passes the concern for sustainability is growing. There are a number of factors that are responsible for a high level debate about sustainability; for example, supply and demand characteristics of energy consumption, concern for climate change, and demand for transparency regarding the environmental and the social performance of organizations (Carter and Easton, 2011). Scholars focused on different dimensions for achieving and improving sustainability but the most widely used dimensions can be found in the triple bottom line concept of John Elkington. The United

Nations (UN) world summit 2005 also describes the three pillar of sustainability: environmental sustainability, social sustainability, and economic sustainability. These pillars or the "triple bottom line" served as a common ground for numerous sustainability standards in business, such as, Global Reporting Initiative (GRI), the Dow Jones Sustainability Index (Jones, 2005), and International Standard Organizations (ISO) 14001(Delai and Takahashi, 2011). Environmental sustainability refers the maintenance of natural capital (Goodland, 1995). Scholars argue that the depreciation of natural capital cannot go on endlessly (Lovins et al., 1999). In organizational perspective, environmental sustainability focuses on the production and consumption of resources by corporations in a responsible fashion. That's why responsible companies keep track to the carbon foot print of their activities and open the records to the public. Social dimension of sustainability stresses on how to bring human wellbeing, how to meet their needs and how to generate development opportunities for all (Comission on sustainable development, 2002). From organizational perspective social sustainability focuses on impact of organizational activity on the stakeholders specifically, employees, customers, suppliers, shareholders and government (Delai & Takahashi, 2011). It can also be related with corporate social responsibility (CSR) practice of the businesses. CSR is the obligation of the firm to its stakeholders. The fulfilment of these obligations is intended to minimize any harm and maximize the long run beneficial impact of the firm on society (Bloom and Gundlach, 2000). Economic sustainability evaluates short term and long term economic value generated by the organizational activities and the corresponding relationship with shareholders (Delai & Takahashi, 2011). It is concerned with long term economic health or organization and accounts for share value, sales growth, profitability, such as, debt-equity, and other important indicators. The studies of sustainability and sustainable development mostly mention about the ways of achieving the economic, social, and environmental bottom lines but the dynamic interrelationships among the factors are not explored much. Very few writers for example, (Carter and Rogers, 2008) in their conceptual study mention that firms that have social and environmental sustainability have better economic performance but still other relationships are unexplored. Therefore, it is important to identify and explore the relationships among sustainability factors.

3.2 Measurement of sustainability

Stakeholders' demand for sustainability report generated the need for measurement of specific indices. As a result initiatives from different angles put forward to the development of specific indices and their measurement scale. Among those GRI, IchemE, DJSI, TBL and ETHOS corporate social responsibility indicators are related with business level sustainability indicators (Delai & Takahashi, 2011). Some indicators are commonly used in most cases for example, health and safety, wages, benefits, Hazard and safety, health, sanitation, forced and child labour, absenteeism, child labour and forced labour in the chain, compliance of health, safety and human rights by the suppliers are widely used social sustainability indicators. Likewise, regarding environmental sustainability, issues such as emission, human health effect, water pollutants, solid waste, waste Recycled or reused, compliance of environmental legislation, performance of suppliers regarding environmental issues, environmental impact of products produced and environmental certification are widely used. Regarding economic sustainability commonly used issues are Sales, Net income and Return on average capital employed (Delai & Takahashi, 2011). There are differences in the organizations based on the multitude of product, services and operations which shapes the requirement of indices need for the specific organization and industry for example, some customized sustainability indicator sets have been developed by (Labuschagne et al., 2005); Wang (2005); (Vasileiou and Morris, 2006); (Hutchins and Sutherland, 2008) which can be applied to the relevant field. In literature, study with respect to apparel industry sustainability and measurement of sustainability indicators is very rare. Study regarding apparel supply chain sustainability is even rare. The study of (de Brito et al., 2008); Sunhilde, 2008 and (Emmelhainz and Adams, 1999) can be cited to mention about the apparel industry sustainability indicators. The study of (Islam and Deegan, 2008); (Islam and McPhail, 2011); (Naeem and Welford, 2009); (Hossain et al., 2012) provide some idea about social and environmental sustainability indicators for manufacturing companies of Bangladesh specifically, the RMG companies. But these studies are limited to mostly social sustainability indicators and unit of analysis is not the whole supply chain. The study of Chowdhury et al., (2012) explore the buyers'

sustainability requirements and corresponding design requirements of the RMG supply chain of Bangladesh but the study is based on limited number of case companies and sustainability components. Further, the interrelationships among the components are not discussed in that study. Therefore, a detailed study regarding sustainability measurement constructs with large number of samples is important and this study attempts to do so.

3.3 Sustainable supply chain management

A sustainable supply chain (SSC) is one that "manage material, information and capital flows and cooperate among all entities in the chain with a view to achieve the economic, environmental and social goals deriving from customer and stakeholder requirements" (Seuring and Muller, 2008). To be responsible to stakeholders, environmental and social burden due to different stages of production need to be acknowledged. Therefore, focal firms of supply chains shall be held accountable for the environmental and social performance of supply chain members (Koplin, 2005). In this regard, branded companies sometimes come under pressure from stakeholders, such as government, activists, non-governmental organizations (NGOs) if there is problem in the chain (Seuring and Muller, 2008). Likewise, the branded apparel chains such as Nike, Disney, Levi Strauss, Benetton, Adidas or C&A have been accused few years back for problems in the upstream supply chain with respect to production of their clothing. The poor and inhumane working conditions (Preuss, 2001; (Graafland, 2002) or contaminations of the local environment (Seuring, 2001) often creates problem in the chain.
The environmental impact of apparel industry is very high (Caniato et al., 2012) because the processes of dyeing, drying and finishing, make intensive use of chemical products and natural resources (de Brito et al., 2008). Moreover, the production of fibres, such as cotton, wool and synthetics, has a significant environmental impact (Caniato et al., 2012). In such a situation the social and environmental factors along with economic factors need to be considered throughout the supply chain carefully. Despite the essence of SSCM, the literature on SSCM is limited and not enough (Gold et al., 2010). In the management literature, most of the existing studies on organizational sustainability and supply chain sustainability have focused on environmental aspects and have little consideration to social and economic aspects (Carter and Rogers, 2008). The study of (de Brito et al., 2008); (Hutchins and Sutherland, 2008); Chowdhury et al. (2012);(Islam and Deegan, 2008) are perhaps the only studies that consider both social and economic sustainability in supply chain. But the study of de Brito et al., (2008) analyses sustainability only from logistical point of view and lacks indication regarding influence of manufacturing operation on social and environmental aspects. Similarly, Hutchins and Sutherland, (2008) studied on supply chain sustainability mainly on social perspective that are linked with macroeconomic activities.(Islam and Deegan, 2008) studied the importance of determination of social code of conduct in the apparel supply chain and execution of those in the chain without detailed indication regarding social issues to be followed by the supply chain members. Further, it only highlights social factors while environmental and economic issues are ignored. In this regard (Carter and Rogers, 2008); Carter and Jennings (2002) rightly mentioned that integrated study incorporating economic, social and environmental aspects is sparse. The study of (Carter and Rogers, 2008) is a milestone in the literature of SSCM. Using the triple bottom line concept of John (Elkington, 1999) as a core, they introduce a theoretical framework of sustainability in supply chain which they denoted as SSCM. (Carter and Rogers, 2008) suggest that SSCM is essential for organizations as SSCM enables the long-run improvement of an organization's economic bottom line. Though informative and widely covered, the study is still conceptual and has lack of indication about measurement aspects of social, environmental and economic issues. The underlying study fills the gap by considering all aspects of sustainability in the chain, in the midst of existing void of lacking integrated empirical work on social, environmental and economic aspects in supply chain. It also addresses the interrelation among the social, environmental, economic and other aspects of SSCM.

4. RESEARCH DESIGN

The field study has been conducted by employing qualitative method as the research paradigm (Zikmund, 2003). A semi-structured interview approach has been adopted in this regard so that the researcher may better understand the pros and cons of the research area. The review of the literature

has provided the framework for initial development of the interview questions. The literature also helped in refining the interview questions so that it fits better to the actual situation. Once the method of collecting data is selected, it is obvious to select the samples. The sampling method used for this study is a convenience non-random type.

4.1 Sample selection

Purposive sampling has been adopted to select the companies from the list of companies in the directory of BGMEA. The companies situated in Chittagong are considered for interview. Fifteen managers from middle and top management hierarchy have been chosen for interview. The supply chain managers and the persons dealing with supply chain functions of the organization where there is no supply chain manager have given priority for sample selection. The selection of all interviewees was based on personal contacts. Therefore, nonprobability sampling or convenience sampling is employed in this regard (Babbie 2001).

4.2 Data collection and recording

Once the sample selection is determined the interviewees were approached through telephone to take their interview schedule and eventually to participate in the field study. The response was encouraging as 15 of them out of eighteen have been agreed to participate in interview. The interviews were recorded with the permission of the participants and notes were taken throughout the interview. The interview duration was one hour and fifteen minutes on an average. The data were transcribed immediately after interview so that the senses and tunes of the interview are reflected properly.

4.3 Data analysis

In this research for analysis of the collected data from field study, content analysis has been used. From the content analysis the relationship between different constructs are explored. It is a good technique and widely applied in previous research for example, Xu and Quaddus (2005) employed it to examine the applicability of the qualitative data to transform into quantitative data for statistical analysis. NVIVO-9 software program has been used to facilitate the data analysis process.

5. FINDINGS AND RESULTS

5.1 Findings of sustainability Factors

It is revealed that sustainability in RMG supply chain is dominantly perceived as buyers' requirement. The RMG manufacturers of Bangladesh are almost export oriented and largely depend on western buyers such as Wal-Mart, Kmart, Nike, H&M, C&A, GAAP and others. These buyers face pressure from consumers, activists and government to ensure social and environmental quality in the supply side. As a result foreign buyers impose some social and environmental compliance issues on RMG manufacturers and the suppliers. If the RMG supply chain members do not comply with these requirements they will not get order from buyers. Therefore, the sustainability components have been characterized here as compliance of supply chain requirements. To them, for sustainability of RMG supply chain, compliance of the buyers' requirements is must. For example, regarding social compliance almost all the respondents opined that they need to ensure the social compliance issues because buyers are highly concerned about it. In line with the compliance of social factors, as an instance, participant 6 opined that *"Today if you do not have social code you cannot do business….."* Besides, the social compliance issues, from the content analysis it is revealed that RMG supply chain members need to ensure that their products are free from environmental and health hazardous components.

A deeper and detailed idea about RMG supply chain sustainability factors can be obtained from the discussion in the light of Table 1.

Constructs	Sub-constructs	Variables	Enterprises														
			1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Social compliance	Wages and benefits	Minimum standard wages	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y
		on time salary and overtime payment	y	y	y	y	-	y	-	y	y	y	y	-	y	y	
		Transportation	-	-	y	y	-	y		y	y	-	-	-	-	-	
		weekly holiday	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y
		Leave benefits	y	y	y	y	-	y	-	y	y	y	y	-	y	-	
		break and food	y	y		-	-	-	-	y	y	-	-	-	-	-	
		medical facility	y	y	y	y	-	y	y	y	y	y	y	-	-	-	
		Group Insurance	y	y	y	-	-	y	-	y	y	-	y	-	-	-	
		baby care facility	y	y	y	y	y	y	y	y	y	y	y	-	-	-	y
	Hazard and safety	Fire safety tools and other PPE	y	y	y	y	y	y	y	y	y	y	y	y	-	-	y
		Factory safety standard	y	y	y	y	y	y	-	y	y	y	y	y	y	y	y
		Temperature control	y	y	y	y	-	y	y	y	y	y	y	y	y	-	
		Proper Light and ventilation	y	y	y	y	y	y	y	y	y	y	y	y	y	-	
	Health and sanitation	Dust control	y	y	y	y	-	y	-	y	y	y	y	-	-	-	
		Cleaning	y	y	y	y	-	y	y	y	y	y	y	-	-	-	
		Adequate toilets	y	y	y	y	-	y	-	y	y	y	y	-	-	y	
		Pure drinking water	y	y	y	y	y	y	-	y	y	y	-	-	-	-	
	Human rights and Others	child labour	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y
		Standard Working hour and no force labour	y	y	y	y	y	y	-	y	y	y	y	y	-	y	y
		No Harassments	y	y	y	y	-	y	-	y	y	y	y	y	-	-	y
Factor	**Variable**		**Enterprises**														
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Environmental compliance	Controlling water pollution (ETP)		y	y	y	y	-	y	y	y	y	y	y	y	y	y	-
	Controlling air pollution		y	y	y	y	-	y	y	y	y	y	y	-	-	-	-
	No soil pollution or careful disposal of waste		y	y	y	y	-	y	y	y	y	y	y	-	-	-	y
	Recycling wastes or selling to recyclers		y	y	y	y	y	y	y	y	y	y	y	-	-	-	y
	Controlling the use of hazardous material		y	y	y	y	y	y	y	y	y	y	y	y	y	y	y
	Complying environmental legislation		y	y	y	y	-	y	y	-	y	y	y	y	y	y	-
Operational compliance	Delivery lead time		y	y	y	y	y	y	y	y	y	y	y	y	y	y	y
	Quality		y	y	y	y	y	y	y	y	y	y	y	y	y	y	y
	Reliability regarding quality, design and other specification		y	y	y	y	y	y	y	y	y	y	y	y	y	y	y
	Efficient and Updated Machinery and technology		y	y	y	-	-	y	-	y	y	y	y	-	y	-	-
	Factory getup				y	y				y	y		y				
Economic Sustainability	Sales and business volume		y	y	y	y	y	y	y	y	y	y	y	y	y	y	y
	Cost		y	y	y	y	y	y	y	y	y	y	y	y	y	y	y
	Profit		y	y	y	y	y	y	y	y	y	y	y	y		y	y
	Sales growth		y	y	y	y	y	y	-	y	y	y	y	-	y	-	-
SC Governance	Monitoring the social Performance of suppliers		y	y	y	y	-	y	-	y	y	-	y	-	-	-	-
	Monitoring the environmental Performance of suppliers		y	y	y	y	-	y	-	y	y	-	y	-	-	-	-
	Social and Environmental certification and audit		y	y	y	y	-	y	-	y	y	-	y	-	-	-	-

Table-1: Factors and variables of RMG supply chain sustainability.

5.1.1 Social Compliance

RMG manufacturers and the suppliers need to comply with social and environmental aspects. According to the participants of field study the RMG manufacturers and suppliers try to comply with the buyers requirements otherwise, they will not get order and cannot sustain in the market.

Participant 6 for example, exposed that *"regarding some social compliance issues such as child labour issue buyers show zero tolerance …."*

Digging deeper into the component of social compliance issues it is revealed from table-1 that buyers demand for a number of social factors such as wages and benefit of workers, hazard and safety issues, health and sanitation factors and human rights issues. There are a number of issues needed to comply under the factors: wages and benefit, hazard and safety and others. For example, regarding wages and benefit, the RMG supply chain members need to ensure minimum wage standard, overtime payment, leave benefit, weekly holiday, medical benefit, childcare facility and so on. In line with wages and benefit issues participant 4 enumerated that *"…. We must need to pay a minimum wage of 3000 taka per month for 8 hours working day as per labour law and we need to show the pay register to the auditor…."* Participant 4 added that *"if we do not maintain these requirements we will lose business and we cannot continue our business long term."*

Participant 9 provides a broader view of social compliance issues and entailed that *"…We need to ensure good working environment and health hazard and safety issues. We have child care facility and we maintain good sanitation for example, we have two cleaners for each floor, have one toilet for every 25 workers. Further, we provide medical facility and maternity leave, weekly leave and other entitled leaves….."*

Regarding social compliance, it can be summarised from table -1 that except some self-motivated social issues such as transport facility and break and food, and insurance other social issues are ensured by majority of the participants as these are imposed by the buyers. It is identified that regarding child labour, forced labour all respondents (N=15) are very serious because buyers are very strict on those issues. Based on the above analysis it seems that

Supply chain members that comply with the social aspects have better social sustainability.

5.1.2 Environmental compliance

With the passage of time RMG buyers are imposing pressure on RMG manufacturers and suppliers to comply with environmental issues as well. It is reflexed from the content analysis and from table-1 that majority of the participants are concerned about the environmental issues. For example, more than 80% of the respondents (N=13) focused on controlling water pollution and about 70% of the respondents (N=10) mentioned about controlling air pollution. To them, buyers now want to see to what extent the RMG manufacturers and their suppliers are complying with environmental issues. The environment department of the government is also strict about the effluent disposal and emission of pollutant. It has been explored that the RMG supply chain members need to treat the pollutants by effluent treatment plant (ETP), and have to obey the environmental legislations set by the ministry of environment. Regarding environmental compliance Participant 11 for example, explained that: *"…We have effluent treatment plant (ETP) in our entire factory to reduce chemical and water pollution. This is demanded by environment ministry and by the buyers….."* Participant 11 added that *"We sell the big clothing wastes to the small local garments and small clothing wastes to the recyclers…"*

Along with these, it is exposed from table-1 that all of the RMG supply chain members expressed high concern on use of environmental and health hazardous ingredients (N=15). Meanwhile, the issue of environmental certification, and compliance of environmental legislation are supported by majority of the respondents. To the respondents, buyers' topmost prioritized issue is restricting the use of hazardous material in the products. No environmental and health hazardous items can be used in the finished product. To ensure it, there are some mandatory laboratory tests which the RMG supply chain members need accomplish by the buyers' nominated agents or labs. If any environmental and health hazardous ingredient is found in the test report the whole batch of product is rejected which cannot be exported. In line with this, participant 4 illustrated that *"…..The nominated as well as non-nominated suppliers need to show test report of materials to ensure that supplied goods are lead free, azo free and free from other environmental hazards.* He further stated that *"Finished goods also need to be tested before shipment."* From the above analysis it appears that

Supply chain members that comply with the environmental aspects have better environmental sustainability.

5.1.3 Operational compliance

In RMG supply chain, meeting lead-time, quality standard and buyers' specification are very important. Failure to comply with these requirements creates buyers' dissatisfaction and cancellation of order. Table-1 portrays that except factory getup (N=5), and efficient and updated machinery (N=9), all participants laid emphasis on conformance of quality of products, meeting delivery lead time, maintaining reliability on specifications. RMG products are sensitive to design, colour and use of accessories. The manufacturers need to submit samples for buyers' approval before producing in a bulk quantity. If the size, colour, design and other specifications are approved by the buyers, operation is started for bulk production. Sometimes, buyers reject some batches of products because of non-conformity of sample with bulk. It's a huge economic loss and loss of reputation of the company. Moreover, buyers set a fixed lead time and within this time the manufacturers need to procure, produce and deliver the finished products. If there is any deviation buyers are dissatisfied and may even reject the shipment. Regarding this, participant 6 as an instance, stated that "*In garments business you must respect the time. Otherwise, you need to quit from business.*" It justifies that RMG supply chain members are serious about meeting the operational compliance issues otherwise it will be difficult to sustain. In this regard participant 1 affirmed that *"… We must be careful about time because our lead time is fixed {….} we also need to prove that our quality is good. We test quality when we buy material from suppliers and show the sample to the buyer. If buyers approve the sample then we buy material from suppliers…."*
Regarding efficient and updated machinery some of the participants opined that if they use good machinery, output quality will be good. For example, participant 8 stated that *"We use Japanese Zuki machine for production because buyers like it".* From the above analysis it seems that

Supply chain members that comply with the operational aspects have better operational sustainability.

5.1.4 Economic Sustainability

For sustainability, economic efficiency is important. If an organization cannot show economic efficiency it cannot compete in market and eventually get out from business. Table–1 shows that respondents mentioned about the economic aspects such as sales volume, cost, profit and sales growth. All of the 15 participants supported the importance sales volume, cost, and profit whereas, 11 participants out of 15 focused on sales growth for economic sustainability. They mentioned about the importance of sales order to make profit and to pay the workers properly. Sometimes, if the order is not enough they cannot run production floor and cannot bear the costs. Further, the suppliers of RMG manufacturers opined that their business and profit depend on the business growth of garments manufacturers. One of the suppliers (participant 13), for example, quoted that "…. *We have enough sales which are increasing every year because garments export is increasing. In this situation we can make good profit after meeting all costs. I think we will sustain if this trend goes on."* Moreover, according to the participants, the market is competitive now and cost is very important factor to all. Some of them opined that they are facing competition both from domestic and international market. In such a situation, if the garments manufacturers cannot quote a competitive price they cannot compete. To some respondents cost of production is increasing because cost of power, labour costs, and material cost are increasing day by day. Regarding cost factor participant 4 for example, enumerated that: **"…** *we calculate the cost of product in advance to submit quotation to the buyers.* From the above analysis it seems that

Supply chain members that have better performance on economic aspects have better economic sustainability.

5.1.5 Sustainability Governance

The emerging issues such as business ethics through entire value chains, human rights, bribery and corruption, and climate change, violation of social and environmental issues in the supply chain has

generated the debate of sustainability governance in the organizations and their supply chains (Elkington, 2006; Chowdhury et al., 2012). Along with the RMG manufacturers, the suppliers also need to maintain social compliance issues. The buyers govern the whole chain and in some cases, for better control, they specify/nominate the suppliers from which the manufacturers need to procure material. The nominated suppliers are certified and evaluated by the buyers. Buyers monitor their plants time to time to inspect compliance issues. Sometimes buyers do not specify/nominate any supplier when place orders to RMG manufacturers. In that case the reputed and large garment manufacturers try to ensure compliance issues in their suppliers' and sub-contractors' plant otherwise, any information regarding violation of social and environmental issues in the suppliers' plant may create buyers' dissatisfaction and cancellation of order. Regarding supply chain governance for social compliance, participant 13, for example, stated that *"We need to maintain social compliance issues. Because we* are buyer nominated supplier. Buyers come and visit our factory to monitor compliance issues…."

In line with this participant 11 added that *"we monitor and guide our suppliers regarding social and environmental issues so that buyers do not find faults in our suppliers' plant….."* However, regarding the issues of evaluation and monitoring of suppliers (2^{nd} tier supplier), health and sanitation issues, RMG suppliers are a bit relaxed in comparison to the RMG manufacturers. In this regard supply chain governance (suppliers of RMG manufacturers) is important. Based on the above analysis it seems that

Supply chain members that have sustainability governance have better social and environmental sustainability.

5.2 Relationships among sustainability factors

A number of important relationships among the above mentioned sustainability factors have been extracted from the content analysis of the field study data. The relationships among the factors are shown by table: 2

Relationship	Enterprises														
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Social compliance → economic sustainability	y	y	y	y		y	y	y	y	y	y	y	y	y	y
Environmental compliance → economic sustainability	y	y		y		y				y	y	y	y	y	
Social → operational compliance	y	y				y		y	y						y
Operational → economic sustainability	y		y					y	y						y
Economic compliance → social compliance			y	y	y		y								y
SC governance → social compliance	y	y	y	y		y		y	y		y				
SC governance →environmental compliance	y	y	y	y		y		y	y		y				

Table-2: Relationships among sustainability factors

Some interesting relationships among the components of sustainability can be observed from table-2 which are fully new in the literature. For example, the relationships between social and economic, social and operational, economic and social as well as environmental and economic factors are explored in this study. 14 out of fifteen respondents supported the relationship between social compliance and economic sustainability. In line with this, participant 7 entailed that *"We need to maintain social compliance issues because buyers do not place order to non-compliant factories…."* This statement justifies that if the RMG manufacturers and suppliers do not comply with social sustainability factors they will not get sales order from the buyers and eventually they will be economically loser.

More than half of the respondents agreed on the relationship between environmental compliance and economic sustainability. In this regard, participant 13 opined that *"Our buyers are concerned about environmental factors…"* Participant 2 justified this by stating that *"…..our brand eco-verdy is*

environment friendly. It is from recycled product. Buyers as well as final customers prefer eco-friendly products and it also increases our brand reputation."

Regarding the relationship between economic sustainability and social compliance, participants stated that if they have enough profit they can provide more benefit to the workers. One third of the participants supported this relationship. In line with this participant 15 for example told that "*we cannot provide benefit to the workers if we face loss….."*

Another valuable finding of the field study is the relationship between social compliance and operational compliance (N=6) as well as operation compliance and economic compliance (N=5). It is revealed that apart from buyers' requirements, to satisfy the employees, some of the RMG manufacturers provide some more benefits to the workers such as transportation (e.g. company 3,4,6,8,and 9), food and break (e.g. company 1,2,8 and 9); insurance (e.g. company 1,2,3,6,8,9 and 11). These proactive companies have come to realize that compliance of social factors help them to get operational and economic benefits. As a result they are not only complying buyers' requirements but also are motivated to ensure workers satisfaction through providing additional benefits.

Regarding the relationship between social compliance and operational compliance, participant 6 clarified that *"Through discharging social responsibility we may have good people with us because it's a people intensive industry. If you develop a good community relationship you will get good and responsible worker and they will stay with you rather than switching. It will help to reduce production disruption and you can maintain commitment with the buyers regarding on time delivery."* From the quotation it can be deduced that, the fulfilment of social issues helps to reduce operational disruption (worker switching, quality problem) which helps to processing of products smoothly and eventually helps in economic gain through satisfaction of buyers.

The relationship between operational compliance and economic sustainability can be justified from the statement of participant 1: *"In garment business you need to prove that your quality is good. { ….} Our quality is premium quality as a result we have good market image."*

The field study also explored the relationship between supply chain governance and social and environmental compliance. It is exposed from table-1 that RMG suppliers are comparatively relaxed in social and environmental issues. In this regard some of the RMG manufacturers evaluate and monitor their suppliers' plant as the buyers, in some cases, want to see the social and environmental performance of 2nd tier suppliers. In case of nominated suppliers buyers directly monitor 2nd tier suppliers performance. Regarding supply chain governance participant 8 stated that "*to ensure social and environmental compliance we need to monitor our major suppliers' plant because suppliers often do not comply with some of the social and environmental standards…"* Based on the above analysis it seems that

There is a positive relationship between social compliance and economic sustainability.

There is a positive relationship between environmental compliance and economic sustainability.

There is a positive relationship between social compliance and operational compliance.

There is a positive relationship between operational compliance and economic sustainability.

6. DISCUSSION IN THE LIGHT OF PROPOSED MODEL

Based on the findings of this paper a comprehensive model of Sustainable supply chain management (SSCM) has been developed which is shown in Figure-1. The inputs of the model are the factors and variables derived from the findings of the field study (shown in table-2) most of which are justified by the literature (shown in table-3). The model represents that for achieving sustainability, supply chains, specifically, the RMG supply chains of Bangladesh, need to comply with social, economic, environmental and operational compliance of the buyers and other stakeholders. This can be linked with the stakeholders' requirement of maintaining balance among social, environmental and economic interest as per stakeholder theory (Freeman, 1984). It is revealed from the field study that RMG manufacturers and the suppliers are conscious about some of the important social and environmental

factors which are highly emphasized by the buyers. For example, regarding wage, child labour, force labour, fire safety, and free from using hazardous material most of the respondents are serious. However, compliance of these issues is still needs to be governed properly so that incidences like fire, loss of life due lack of safety and labour unrest shall not occur time and again. Apart from the compulsory compliance issues, other social and environmental factors are not much observed by the organizations in general except the large and reputed organizations.

In the SSCM model, factors such as operational compliance and sustainability governance are new and unique contribution to this study. The operational compliance issues such as timely delivery, quality, and meeting specifications according to the purchase order are important to the RMG manufacturers to comply with requirements and expectation of the buyers which can be justified by the stakeholder theory corresponding to fulfilment of expectation of the stakeholders. Stakeholder theory advocates some principles which guide the normative cores regarding what need to be governed and what managers ought to act (Freeman 1984). The ethical violation of principles for example, false reporting by Enron and child labour, forced labour issues in apparel industry (Islam and Deegan, 2008) lead organizations toward erosion of sustainability (Kolk and Pinkse, 2006). In such situation, monitoring and governance of compliance issues are needed to retain sustainability (Kolk and Pinkse, 2006). In line with this it can be argued that the component *supply chain sustainability governance* of this SSCM model has relevance and importance for sustainability of RMG supply chain of Bangladesh.

Along with the factors and variables of sustainability, some important relationships among the factors have been extracted in this study and included in the comprehensive research model. The existing literature supports that there is a positive relation between social and environmental sustainability with economic sustainability (Carter and Rogers, 2008). However, empirical evidence of these relationships is rare. The relationship between social compliance and operational compliance; operational compliance and economic sustainability; economic sustainability and social compliance are not exposed before by the existing SSCM models. The proposed model extends the traditional triple bottom line components and it explores some new relationship among the sustainability components which are mentioned above. Moreover, the other models are mostly developed based on conceptual study and very few of those have theoretical foundation but this model is based on empirical study and has theoretical base.

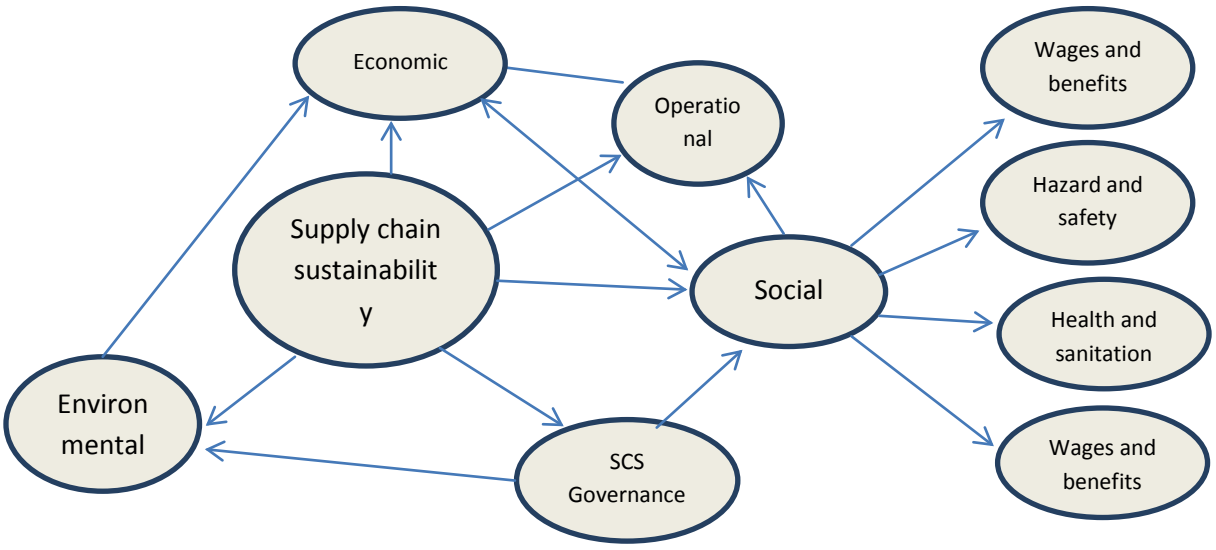

Figure-1 Comprehensive research model

Factor	Variable	References
Social compliance	Wages and benefits	GRI, ICHemE, TBL Index, Minimum Wage Fixing Convention, 1970; GRI, ICHemE, TBL Index;
	Hazard and safety	ILO Occupational Safety and Health Convention, 1981;
	Health and sanitation	CSD, Dashboard, GRI, ILO Occupational Safety and Health Convention, 1981; ILO Working Environment Convention, 1977 (No. 148)
	Human rights	GRI; ILO Minimum Age Convention, 1973; Forced Labour Convention, 1930
Environmental	Water pollution	GRI, IChemE, Epstein and Wisner, 2001
	Air pollution	GRI, IChemE, Epstein and Wisner, 2001
	Soil pollution	GRI, TBL, CSD
	Recycling wastes	TBL, CSD, Dashboard index, Epstein and Wisner, 2001
	Use of Hazardous material	IChemE index, Epstein and Wisner, 2001
	Complying environmental legislation	GRI, TBL
Economic	Sales and business volume	GRI, IChemE, TBL
	Cost	GRI, IChemE
	Profit/net income	GRI, IChemE, TBL
	Sales growth	Epstein and Wisner, 2001
Operational	Delivery lead time	Bicheno, 1998; Bateman and David, 2002
	Quality	Bicheno, 1998; Bateman and David, 2002; Epstein and Wisner, 2001
	Factory getup	
	Meeting quality, cost and other specification	Duclos,Vokurka and Lummus, 2003
	Efficient and Updated Machinery and technology	
SC Governance	Monitoring the social Performance of suppliers	GRI index, Epstein and Wisner, 2001
	Social and Environmental certification and audit	

Table-3: Justification of the extracted factors and variables from literature

7. LIMITATIONS AND DIRECTIONS FOR FURTHER RESEARCH

Our study has some limitations which open opportunities for further research. Limitations of this study are inherent 1stly, in the chosen method of conducting the study. The study is based on case study which needs an empirical verification by survey research to prove the external validity of the SSCM model developed in this research. The researchers attempt to further examine the comprehensive SSCM model by taking quantitative research method through empirical surveys. Structural equation modelling (Barclay et al., 1995) will be used to test the relevant proposed hypotheses. Another limitation of this research is, it considers only the measurement components of Supply chain sustainability while the antecedents of supply chain sustainability, which are denoted as supporting facets of sustainability, such as risk management, transparency, strategy, culture (Carter and Rogers, 2008, 2011); inter-organizational resource and capability (Gold, et al 2010) are not included. A further research is needed considering the antecedents using other theories along with stakeholder theory.

8. CONCLUSIONS

This study uses multiple-case method to identify the factors, sub-factors, variables and links of SSCM model in the context of RMG industry of Bangladesh. A conceptual framework was proposed first

based on literature reviews. On the basis of the conceptual framework, a more extensive research model was then developed using the data collected from 15 decision makers of RMG manufacturers and their suppliers. The interviews were transcribed by the researchers, and the contents were analysed using content analysis approach. As many as five factors and thirty eight variables are explored regarding RMG supply chain sustainability which are justified by the literature. Finally, a comprehensive model is proposed. The proposed model suggests that in order to sustain, the RMG supply chain members need to comply with the social, environmental, economic and operational requirements of the supply chain members and other stakeholders. Some of the supply chain members are a bit relaxed to comply with the social and environmental requirements. Therefore, supply chain sustainability governance is important for RMG SSCM. It reveals that compliance of social, environmental and operational requirements leads to economic sustainability. Further, it is explored that fulfilment of social compliance helps to achieve operational compliance which consequently leads to economic sustainability. In this regard some of the organizations realize that if they ensure a good working environment and keep the workers satisfied they can run the operation smoothly and can improve economic performance. This sort of realization will accelerate the implementation of SSCM in RMG industry of Bangladesh.

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